Colorado Department of Public Health and Environment

Hazardous Materials and Waste Management Division

Comments on

RFI/RI REPORT FOR OPERABLE UNIT 3 (OFFSITE AREAS)

FOR THE ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

October, 1995

General Comments

1 An evaluation of exposure to non-radionuclides in soils was not required by the OU 3 Work Plan, but its absence represents an underestimation of risk The impact of this missing information is never mentioned in this document, including in the uncertainty analysis This missing information must be kept in mind when making any risk management decisions, especially since the risks from potential exposure to radionuclides fall right above the $1X10^{6}$ trigger level

2 The assessment of risk in this document is based on a very limited dataset As mentioned in CDPHE comments on Technical Memorandum (TM) #4, COC Selection (General Comment #2), the limitations in the data really only allow a qualitative human health risk assessment, as stated in this RFI/RI document The lack of good data makes any risk estimates relatively uncertain compared to those possible on other OUs This larger amount of uncertainty should be taken into consideration when making any risk management decisions

3 The application of professional judgement in the form of a "weight of evidence" procedure was performed incorrectly By performing the weight-of-evidence comparison at the end of the COC selection process, after the concentration-toxicity and frequency screens, instead of at the beginning, in place of the Gilbert statistical procedure for those media that have enough data, the risk-driving chemicals have effectively been determined and then eliminated from the assessment because of professional judgement This was unacceptable in TM #4 (General Comment #3 in joint CDPHE and EPA comment letter), and still is unacceptable This same comment was made on OU 2, OU 5, and OU 6 documents

4 The toxicity of chemicals without toxicity factors was not considered in this report These chemicals were identified in TM #4, and should have been carried through as PCOCs and discussed in the RFI/RI uncertainty analysis, as per RAGS guidance (Part A, page 5-23)

Specific Comments

1 Executive Summary (Page ES-5)
In the second paragraph in the Surface Water section, the sentence which reads, "VOCs in Mower Reservoir were not detected", might more correctly be stated, "VOCs were not detected in Mower Reservoir "

2 Figures 4-6A and 4-6B
There are similarities between these isoplots for Pu and Am and OU 2's isopleth maps, but there are also differences Explain the reasons for the differences between these maps

3 Figure 4-9
Some of the profiles shown in this illustration are increasing at the bottom of the sampling interval Sampling location #SED09292, at the influent from Walnut Creek, may not have reached possible Pu contamination If these sediment samples may have missed some of the Pu-contaminated intervals due to lack of sampling depth, the text needs to so state.

4 Section 4 3 2 (Page 4-39)
The text states that, "Figure 4-9 shows the natural variation of the uranium isotopes with depth " However, that phenomenon is illustrated as part of Figure 4-8 Also, Page 4-35 repeats the profiles shown on Page 4-45 Explain the "natural variations of the uranium isotopes with depth "

5 Section 4 3 2 (Page 4-39)
The 7th paragraph in this section mentions UTL exceedances for uranium These exceedances may be significant, particularly because they are located along the Woman Creek drainage There is strong historical and analytical evidence that U-238 is a chemical of concern in OU 5 upstream from OU 3 RAGS, Part A, page 5-21, states that, "chemicals reliably associated with site activities based on historical information generally should not be eliminated from the quantitative risk assessment, even if the results of the procedures given in this section indicate that such an elimination is possible " Uranium was eliminated by means of a PRG comparison, but it needs to be shown additionally that it is likely to be naturally occurring and not tied to plant activities

6 Section 4 4 (Page 4-40)
Explain how a dissolved fraction concentration can be greater than the corresponding total (unfiltered) concentration

7 Sections 4 6 3 and 7 1 4 (Pages 4-69 and 7-2)
The statement that "the groundwater pathway is not a complete pathway" must be explained and justified No groundwater COCs have been identified for OU 3 However, what prevents a complete pathway via groundwater wells in the future?

8 Section 5 1 2 (Page 5-4)
The first paragraph in this section does not list groundwater as a reasonable pathway from Rocky Flats In light of comments at recent public meetings, this conclusion needs to be

more thoroughly explained somewhere in this document

9 Section 7 5 (Page 7-7)
Any conclusions regarding future action or no-further-action at OU 3 is not appropriate in the context of an RFI/RI Report

10 Appendix A - Executive Summary (Pages A-3 and A-4)
It is not clear in this section which exposure pathways are included in the risk estimates Are the indirect pathways included as well as the direct pathways? Explain the statement concerning the RME estimated excess lifetime cancer risks, "this includes risk from all pathways except internal and external radiation" What is left if these pathways are excluded?

11 Appendix A - Executive Summary (Pages A-6 and A-7)
As mentioned in General Comment #1 above, this report should mention the uncertainty that comes from not assessing the non-radionuclide chemicals in surface soils at OU 3 In addition, DOE did not discuss the uncertainty due to exposure to more than one chemical

12 Appendix A - Section A2 3 (Page A-14)
The discussion on this page of current and potential agricultural receptors is much improved over previous reports However, there is no mention of cattle herds in this discussion Since beef ingestion is later assessed, it should be mentioned here

13 Appendix A - Section A2 5 5 (Page A-17)
Especially in a public document, use of jargon such as "benchmark" (as a verb) should be explained or avoided

14 Appendix A - Figure A3-1 and Section A3 6 (Page A-19 and A-30)
The CDPHE Conservative Screen Process includes an ARARs comparison step along with assessment of dermal exposure prior to a decision on whether a site is acceptable for no further action The text and the diagram should be corrected to include this step

15 Appendix A - Section A3 2 (Page A-20)
Both CDPHE and EPA have commented on the use of literature benchmark data for comparison with OU 3 data as part of the "weight-of-evidence" approach Front Range soil data or Rocky Mountain National Park lakes simply cannot be compared with Rocky Flats areas without some geochemical analysis and matching An adequate geochemical comparison has never been provided

16 Appendix A - Section A 3 2 5 (Page A-25)
Lake and stream data has apparently been combined since any stream data comparisons seem to be lacking in this RFI/RI Report Both agencies have stated that the weight-of-evidence approach should only be used for lake sediment and lake water analyses Appropriate site-specific background data for stream reaches between Indiana St and the reservoirs exists, and should have been used Even if the stream data was limited, it

would not be appropriate to combine stream and lake sediment data, because different COCs are likely in these two different environments Only the power of the statistical assessment would be limited by comparing the limited dataset to the Background Geochemical Characterization Report (BGCR) data The statistical assessment of OU 3 data and BCGR data still would have been appropriate to do on the limited stream data available

17 Appendix A - Section A3 4 (Page A-29)
For the last sentence in this section to make sense, the word "no" should be inserted before the word "PCOCs"

18 Appendix A - Section A3 6 (Page A-36)
As noted in General Comment #1, an analysis of organic chemicals in surface soil on has not been included Therefore, this discussion on the risks from dermal contact with surface soil is incomplete

19 Appendix A - Section A4 1 2 (Page A-40)
Essential elements should not be eliminated blindly, but first compared to levels that can cause toxicity according to Region VIII COC selection guidance (also RAGS, part A, page 5-23) Text should be changed to acknowledge this

20 Appendix A - Table A4-2 (Page A-47)
Why was Americium eliminated as a COC in sediments from Great Western? As a daughter of plutonium, which was included as a COC, its concentrations will continually increase

21 Appendix A - Table A4-5 (Page A-52)
Does "NA" really mean "Not Acceptable" as indicated at the bottom of this table?

22 Appendix A - Sections A5 2 1 1, A5 2 2 1, A5 2 2 2, A5 3 2 1 (Pages A-54, A-62, A-68)
The text in this section is not clear on how the exposure point concentration was calculated until Section A5 3 2 1 Since this is a public document, these sections should be revised to avoid confusion

The clarity of this document and ease of review would both have been improved by adding a table showing all the exposure point concentrations used for each exposure pathway Section A5 3 2 1, for example, would have been much more lucid if this had been done

23 Appendix A - Section A5 3 1 (Page A-63)
The second paragraph in this section states that, "intakes are not estimated for any exposure pathway except soil (IHSS 199) and sediment (IHSS 200) ingestion" This statement is unclear, since DOE did intake and risk calculations for indirect pathways such as vegetable ingestion as well

24 Appendix A - Section A5 3 2 1 (Page A-68)
As mentioned in Comment #22 above, the information in this section would have been much more easily understood if a table showing which soil concentrations were used as exposure point concentrations for the ingestion calculations had been supplied It is likewise unclear what concentrations were inputs to the box model for air at sample locations U1A, U2A, and PT14192

25 Appendix A - Sections A5 3 2 1 and A5 3 2 2 (Pages A-68 and A-70)
This report needs to include a series of tables showing the exact calculations used to determine the exposure point calculations for the air pathway Reviewing the detailed assumptions and calculations that were used to go from the box model to the ARC equation in Attachment 3, Table 23-Table 26 and Table 5-Table 8 is necessary to determine if this procedure is appropriate If this information has been provided elsewhere in this report or in another document, it should be referenced

In addition, what is the justification for using the "R" factor (Activity in dust/activity in soil) in these calculations? Where do these numbers come from? Are they site specific?

26 Appendix A - Table A6-1 (Page A-74)
A footnote to this table says, "The toxicity constants for Americium-241 will be used for Plutonium-239, -240" Explain this statement and under what conditions it would apply

27 Appendix A - Section A6 2 1 (Page A-75)
Explain the meaning and use an "intake-to-risk conversion factor" An explanation of this and other terms would be useful to both agency and public readers

28 Appendix A - Tables A7-7 & A7-8 (Pages A-85 - A-88)
RAGS, Part B, page 23 designates the Age Adjusted Ingestion Rate as 114 3 mgy/kgd, not 108 6 mgy/kgd Also, the titles on these two tables are switched Table A7-7 contains beryllium data, not arsenic data, and vice-versa

29 Appendix A - Section A8 0 (Page A-90)
The Uncertainty Analysis is limited by the following
- This section does not discuss the impact to the uncertainty of the risk estimates due to a lack of analysis of any non-radionuclides in surface soil (see General Comment #1)
- This section should also discuss uncertainty introduced into the risk estimates by not including those chemicals which were identified in TM #4 as not having toxicity factors (see RAGS, Part A, page 5-24 and General Comment #4 above)

30 Appendix A - Attachment 1, Table 1
The Central Tendency soil and sediment ingestion exposure factors listed under the Future Recreational scenario were not agreed to After both agencies rejected these numbers, DOE agreed to use 50 and 25 mg/d for child and adult ingestion, respectively (June 15, 1995 letter attached to revised Exposure Factors Template) It appears that the correct, agreed-upon exposure factors have been used in Table 3 of Attachment 3, only the appropriate exposure factors in Table 1 need to be revised

The use of a soil or sediment matrix effect in GI tract (absorption factor) has been proposed in the past, but neither CDPHE nor EPA has approved it The rationale for the agencies' refusal of the proposed use of these matrix effects is that it is not toxicologically appropriate to use a single soil matrix effect across the board, without including site-specific information The 0 5 value is not conservative all the time for all chemicals, and does not accurately reflect the bioavailability of all chemicals at Rocky Flats This soil matrix factor should be deleted from all text and tables, and the intakes and risks which were calculated using this factor should be re-done As it is, all central tendency risks that were calculated using the 0 5 matrix effect value are slightly underestimated

This table lists a Fraction Ingested from Contaminated Source for the child and the adult receptor However, this factor has never been approved by either agency In a letter to Steve Slaten dated April 11, 1995, EPA, with the concurrence of CDPHE, directed DOE to delete the "fraction contacted from the contaminated source" parameter for all open space receptors The only acceptable FC for RME estimates = 1 It is CDPHE's understanding that FC = 1 for RME estimates applies to <u>all</u> receptors Though it appears that DOE followed this agreement for the RME receptors, CDPHE does not believe that final discussions ever took place over the CT values or that agreement was ever finalized for this fraction contacted The agencies' rationale for disapproving of this fraction contacted is that except for the ingestion of homegrown produce under a residential scenario, agency toxicologists feel that the fraction contacted factor is acceptable These factors are described as time-weighted factors in the Template footnotes (June 15, 1995 version) Both CDPHE and EPA believe these factors double-count the time component since the exposure frequency has already been reduced to account for the average time spent at the location In addition, the exposure point concentration term represents the integrated contaminant concentrations which a receptor contacts on average over a period of time, and already takes activity patterns into account

31 <u>Appendix A - Attachment 1, Table 2</u>

This table lists the approved site-specific Respirable Fraction (PM10) for RME and CT receptors However, DOE does not appear to use this exposure factor later on in the intake and risk calculations, as it was set to 1 for both RME and CT receptors Was this factor dropped because the PM10 was factored into the box model? Please provide an explanation

This table substitutes a Respiratory Deposition Factor (RD) of 0 85 into the intake equations for the Respirable Fraction Neither EPA nor CDPHE agree with the use of the 0 85 respiratory deposition factor, even though it was included in the Template A major problem with the 0 85 respiratory deposition factor is that without chemical-specific pharmacokinetic data, it is toxicologically unsound to assume that less than 100% of the small (< 10 μm) particulates deposited in the upper respiratory tract are not available to cause local tissue damage or systemic effects after absorption through the upper respiratory passages or after being coughed up and swallowed Both CDPHE and EPA toxicologists believe that this deposition fraction should be removed All inhalation pathway equations that used the RD should be revised, and the calculations corrected

The phrase "in combination with others" is repeated in Footnote 1

32 Appendix A - Attachment 1, Table 4

The Washoff Factor is included in the June 15, 1995 version of the Template, however, any of these exposure factors which serve to decrease risks were still under negotiation The value in this table, 0 5, is not unreasonable number for a central tendency washoff factor, but it should be based on something more than an arbitrary estimate that, "at least one-half of all contaminated soil or dust particles adhering to root and leaf vegetables and to fruits" Does the Department of Agriculture have any estimates of average amount of dirt washed off of fruits and vegetables?

33 Appendix A - Attachment 1, Table 5

The recommendations in the 1990 EPA document (EPA/600/6-9/003), that DOE references as the source of beef and milk ingestion rates have been superseded by those in several other, more recent documents The OSWER Directive 9285 6-03, Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" states that, "the EFH (Exposure Factors Handbook) provides average ingestion rates for beef and dairy products, and assumes that the farm family produces 75 percent of what it consumes from these categories This corresponds to a "reasonable worst case" (or RME) consumption rate of 75 g/day for beef and 300 g/day for dairy products " These higher, and more recent recommendations for RME values should be used In addition, the EFH average values should be used for the CT exposure factors, since that is a more standard information source than the one that DOE used Finally, a new draft EFH is out for comment This document also lists higher average and 95th percentile values for beef and milk intake than used by DOE in this assessment Therefore, DOE should correct the exposure factors used for these indirect pathways

34 Appendix A - Attachment 3, Table 2

This table does not use a site-wide average for each AOC, as was implied in the text on page A-62 Instead, the table uses these sample concentration values, which are the average of two samplings taken at the sites where the three highest concentrations of Pu were found that exceeded the RBC for soil exposure to a resident The text needs to be revised to more clearly explain how the values were derived

35 Appendix A - Attachment 3, Table 14 (and other applicable tables)

Please provide the reference for the assumption in the footnote that 6% of vegetables ingested are leafy and 96% are reproductive/storage vegetables

36 Appendix A - Attachment 3, Table 29

"Recreation" is misspelled in the title